

Production Occupations

Assemblers

Precision Assemblers

(O*NET 87102C, 93102B, 93102C, 93102D, 93105, 93108, 93111A, 93111B, 93114, 93117, 93197A, and 93197C)

Significant Points

- Virtually all precision assemblers work in plants that manufacture durable goods.
- Most precision assemblers are promoted from the ranks of workers in lesser skilled jobs.
- Projected slower-than-average employment growth reflects increasing automation and the internationalization of production.

Nature of the Work

Precision assemblers are highly skilled workers who assemble a wide range of finished products from manufactured parts or subassemblies. They produce intricate manufactured products, such as aircraft, automobiles, computers, and small electrical and electronic components. Unlike some assemblers who perform simple, repetitive tasks, precision assemblers generally perform a series of more complex tasks.

Precision assemblers may work on subassemblies or the final assembly of finished products or components of an array of products. For example, precision electrical and electronic equipment assemblers put together or modify missile control systems, radio or test equipment, computers, machine-tool numerical controls, radar, sonar, and appliances, and prototypes of these and other products. Precision electromechanical equipment assemblers prepare and test equipment or devices such as dynamometers, ejection-seat mechanisms, and tape drives. Precision machine builders construct, assemble, or rebuild engines and turbines, and office, agricultural, construction, oil field, rolling mill, textile, woodworking, paper, printing, and food wrapping machinery. Precision aircraft assemblers put together and install parts of airplanes, space vehicles, or missiles, such as wings or landing gear. Precision structural metal fitters align and fit structural metal parts according to detailed specifications prior to welding or riveting.

Precision assemblers involved in product development read and interpret engineering specifications from text, drawings, and computer-aided drafting systems. They may also use a variety of tools and precision measuring instruments. Some experienced assemblers work with engineers and technicians, assembling prototypes or test products.

As technology changes, so too does the manufacturing process. For example, flexible manufacturing systems include the manufacturing applications of robotics, computers, programmable motion control, and various sensing technologies. These systems change the way goods are made, and affect the jobs of those who make them. The concept of cellular manufacturing, for example, places a greater premium on the communication and teamwork of "cells" than it does on the old assembly line process. As the U.S. manufacturing sector continues to evolve in the face of growing international competition and changing technology, the nature of precision assembly will change along with it.

Working Conditions

The working conditions for precision assemblers vary, from plant to plant and from industry to industry. Conditions may be noisy and many

assemblers may have to sit or stand for long periods of time. Electronics assemblers, for example, sit at tables in rooms that are clean, well lit, and free from dust. Assemblers of aircraft and industrial machinery, however, usually come in contact with oil and grease, and their working areas may be quite noisy. They may also have to lift and fit heavy objects. In many cases, the increased use of robots or other pneumatically powered machinery has improved working conditions by lowering the overall noise level of the facility.

Most full-time assemblers work a 40-hour week, although overtime and shift work is fairly common in some industries. Work schedules of assemblers may vary at plants with more than one shift.

Employment

Virtually all of the 422,000 precision assembler jobs in 1998 were in plants that manufacture durable goods; 48 percent were electrical and electronic equipment assemblers. The distribution of employment among the various types of precision assemblers was as follows.



Precision assemblers produce intricate manufactured products such as small electrical and electronic components.

Electrical and electronic equipment assemblers	201,000
Machine builders and other precision machine assemblers	74,000
Electromechanical equipment assemblers	50,000
Fitters, structural metal	17,000
Aircraft assemblers	17,000
All other precision assemblers	64,000

Assembly of electronic and electrical machinery, equipment, and supplies, including electrical switches, welding equipment, electric motors, lighting equipment, household appliances, and radios and television sets accounted for 33 percent of all jobs. Industrial machinery assembly of diesel engines, steam turbine generators, farm tractors, mining and construction machinery, office machines, and the like accounted for 29 percent of all jobs. Other industries that employ many precision assemblers were transportation equipment (aircraft, autos, trucks, and buses) and instruments manufacturing.

The following list shows the wage and salary employment of precision assemblers in durable goods manufacturing in 1998 by industry.

Electronic and other electrical equipment manufacturing	137,000
Industrial machinery and equipment manufacturing	122,000
Transportation equipment manufacturing	63,000
Instruments and related products manufacturing	61,000
Fabricated metal products manufacturing	22,000
All other industries	2,200

Training, Other Qualifications, and Advancement

Most precision assemblers are promoted from the ranks of workers in lesser skilled jobs in the same establishment. The ability to do accurate work at a rapid pace is a key job requirement. A high school diploma is preferred.

Applicants need specialized training for some precision assembly jobs. For example, employers may require that applicants for electrical or electronic assembler jobs be technical school graduates or have equivalent military training. Some companies may also provide extensive on-the-job training or classroom instruction on the broad range of assembly duties that employees may be required to perform.

Good eyesight, with or without glasses, is required for assemblers who work with small parts. Plants that make electrical and electronic products may test applicants for color vision, because many of their products contain many differently colored wires. Manual dexterity and the ability to carry out complex, repetitive tasks quickly and methodically are also important.

As precision assemblers become more experienced, they may progress to jobs that require more skill and be given more responsibility. Experienced assemblers may become product repairers if they have learned the many assembly operations and understand the construction of a product. These workers fix assembled articles that operators or inspectors have identified as defective. Assemblers also can advance to quality control jobs or be promoted to supervisor. Experienced precision assemblers also may become members of research and development teams, working with engineers and other project designers to design, develop, and test new product models. In some companies, assemblers can become trainees for one of the skilled trades. Those with a background in math, science, and computers may advance to programmers or operators of more highly automated production equipment.

Job Outlook

Job growth among precision assemblers is expected to be slower than the average for all occupations through the year 2008, reflecting increasing automation and the internationalization of production. As manufacturers strive for greater precision and productivity, work that can be performed more economically or more efficiently by automated equipment will be transferred to these machines. In addition to jobs stemming from growth, many job openings will result from the need to replace workers transferring to other occupations or leaving the labor force.

Recent advancements have made robotics more applicable and more affordable in manufacturing. The introduction of robots should continue raising the productivity of assembly workers and adversely affecting their employment.

The effects of automation will be felt more acutely in some industries than in others. Flexible manufacturing systems are expensive, and a large volume of repetitive work is required to justify their purchase. Also, where the assembly parts involved are irregular in size or location, new technology is only now beginning to make inroads. For example, much precision assembly in the aerospace industry is done in hard-to-reach locations unsuited for robots—inside airplane fuselages or gear boxes, for example—and replacement of these workers by automated processes will be slower and less comprehensive than replacement of other workers such as welders and painters. On the other hand, automation will continue to make more inroads in the precision assembly of electronic goods, where a significant number of these workers are employed.

Many producers send their subassembly or component production functions to countries where labor costs are lower. This growing internationalization of production, promoted by more liberal trade and investment policies, results in shifts in the composition of this country's manufacturing workforce. For example, decisions by American corporations to relocate assembly in other nations may lead to employment reductions for precision assemblers in some industries. A freer trade environment will lead to growth in the export of goods assembled in the United States and will result in the creation of additional jobs in other industries.

Earnings

Earnings vary by industry, geographic region, skill, educational level, and complexity of the machinery operated. In 1998, median hourly earnings were \$18.46 for aircraft assemblers, \$12.59 for fitters, and \$11.18 for electromechanical equipment assemblers.

Median hourly earnings of machine builders were \$14.06 in 1998. The middle 50 percent earned between \$11.11 and \$17.24. The lowest 10 percent earned less than \$9.02 and the highest 10 percent earned \$21.29. Median hourly earnings in the manufacturing industries employing the largest numbers of machine builders in 1997 are shown below:

Motor vehicles	\$16.60
Engines and turbines	14.80
Metalworking machinery	14.30
Construction and related machinery	13.50
Special industrial machinery	13.40
General industrial machinery	12.90

Median hourly earnings of electrical and electronic equipment assemblers were \$10.45 in 1998. The middle 50 percent earned between \$8.35 and \$13.41. The lowest 10 percent earned less than \$6.80 and the highest 10 percent earned more than \$16.55. Median hourly earnings in the manufacturing industries employing the largest number of electrical and electronic equipment assemblers in 1997 are shown below:

Aircraft and parts	\$13.40
Computer and office equipment	11.20
Search and navigation equipment	10.90
Communications equipment	9.90
Electronic components and accessories	8.70

Many precision assemblers are members of labor unions. These unions include the International Association of Machinists and Aerospace Workers; the United Electrical, Radio and Machine Workers of America; the United Automobile, Aerospace and Agricultural Implement Workers of America; the International Brotherhood of Electrical Workers; and the United Steelworkers of America.

Related Occupations

Other occupations that involve operating machines and tools and assembling products include welders, ophthalmic laboratory technicians, and machine operators.

Sources of Additional Information

Information about employment opportunities for assemblers is available from local offices of the State employment service and from locals of the unions mentioned earlier.